

EARLY RADIATION MORTALITY AND RECOVERY IN LARGE ANIMALS AND PRIMATES

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INTRODUCTION

The rationale for large animal studies on early radiation mortality concerns their greater similarity to man in terms of size, metabolic rate, differential counts in peripheral blood, and other physiological factors than is the case for rodents. The phylogenetic relationship between the Rhesus monkey and man provided the incentive to study that species. Because most studies had their origins from consideration of nuclear weapons effects, animal size and depth-dose considerations were important for both neutrons and photons. The rationale for and interest in large animal radiobiology prevailed from the late 1940's to the late 1960's, and much useful information was obtained. Thereafter, interest waned because of high procurement and maintenance costs, and the generally high hassle factor associated with large animal radiobiology. While important experiments with large animals were performed in many laboratories, the major centers were the UT-AEC Agricultural Research Laboratory (UT Farm), the U.S. Naval Radiological Defense Laboratory (NRDL), the Air Force Weapons Laboratory (AFWL), the School of Aviation Medicine (SAM), and the Los Alamos Scientific Laboratory (LASL), and the Armed Forces Radiobiological Research Institute (AFRRI). After the demise of NRDL, a project on sheep was transferred to the Stanford Research Institute (SRI), and very important work proceeded there until about 1974. For reasons that will be obvious later, it is fair to say that more is known about the radiation responses of sheep to photons and neutrons, under a variety of exposure conditions, than any species other than rodents.

In the time and space assigned, we will provide only a brief overview of large animal responses, identify where relevant data reside, and present some results not readily available in the open scientific literature. Emphasis is placed on presenting data collected during the final years of NRDL's existence that were not included in reviews by Ainsworth et al. (1) and Page (2) in 1968. We also

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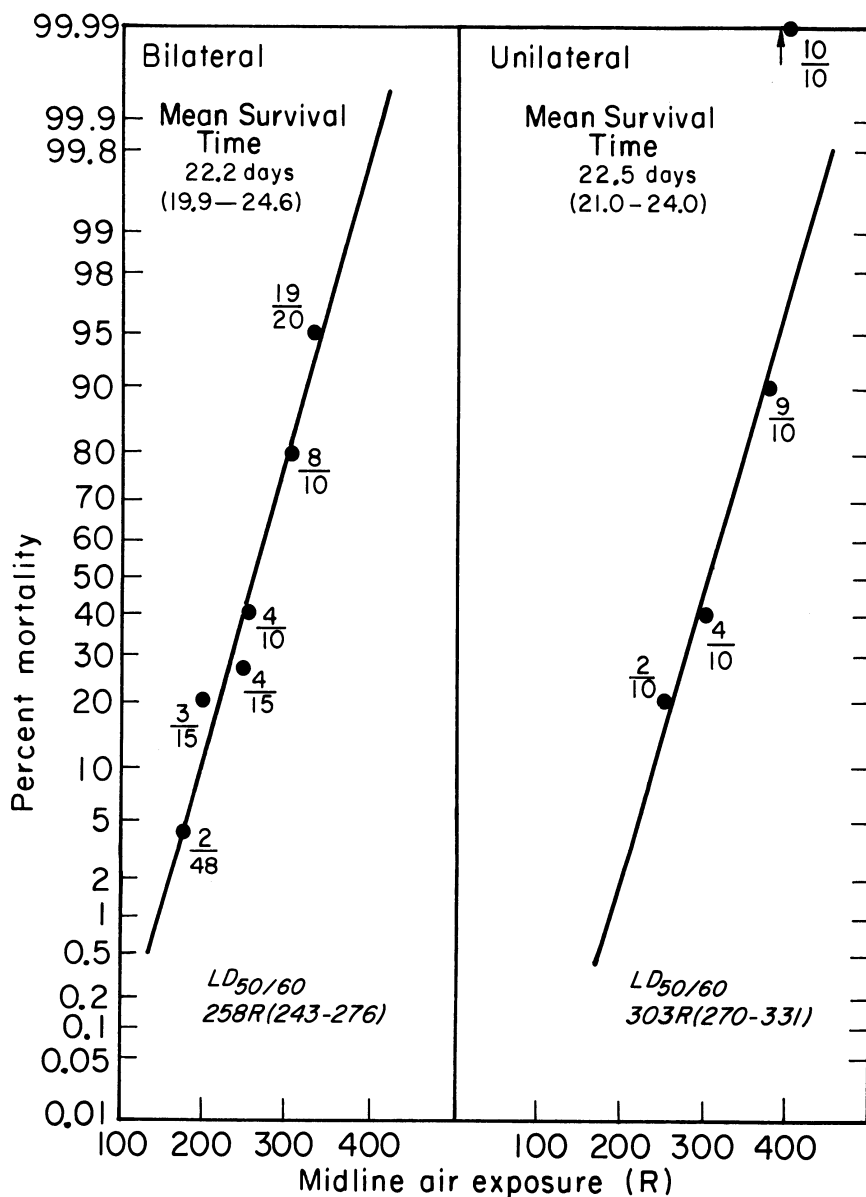


Figure 1 - Dose-response curves for Bilateral and Unilateral X-Irradiation of Sheep (1 MVP). The fraction by each point represents the number dying over the number exposed. The 95% confidence intervals are shown in parentheses. From Taylor *et al.* (11).